"COMPARATIVE STUDY ON THE EFFICACY OF MUSCLE ENERGY TECHNIQUE VERSUS MAITLAND MOBILIZATION IN TREATING SACRO ILIAC JOINT DYSFUNCTION"

A Dissertation Submitted to

The Tamilnadu Dr.M.G.R.Medical University,

CHENNAI

In partial fulfillment of the requirements

For the award of the

MASTER OF PHYSIOTHERAPY

(Advanced Physiotherapy in Orthopaedics)

DEGREE

Submitted by

Reg.No.271410062

NANDHA COLLEGE OF PHYSIOTHERAPY

ERODE -638 052

APRIL 2016

“COMPARATIVE STUDY ON THE EFFICACY OF MUSCLE ENERGY TECHNIQUE VERSUS MAITLAND MOBILIZATION IN TREATING SACRO ILIAC JOINT DYSFUNCTION”

NANDHA COLLEGE OF PHYSIOTHERAPY

ERODE -638 052

The dissertation entitled

Submitted by

Reg.No.271410062

Under the guidance of

Prof. V.MANIVANNAN.,M.P.T(ORTHO)

A Dissertation Submitted to

The Tamilnadu Dr.M.G.R.Medical University,

CHENNAI

Dissertation Evaluated on ……..

Internal Examiner External Examiner

CERTIFICATE BY THE HEAD OF THE INSTITUTION

PROF.V.MANIVANNAN, M.P.T. (ORTHO)
Principal/Head of the Institution,
NANDHA COLLEGE OF PHYSIOTHERAPY,
ERODE -636 052.

This is Certify that **(Reg. No. 271410062)** is a Bonafide student of **Nandha College of Physiotherapy, studying Master of Physiotherapy (Advanced Physiotheraphy in orthopaedics)** degree course from the year 2014-2016. The dissertation entitled, **"COMPARATIVE STUDY ON THE EFFICACY OF MUSCLE ENERGY TECHNIQUE VERSUS MAITLAND MOBILIZATION IN TREATING SACRO ILIAC JOINT DYSFUNCTION"** is a record of original and independent work done by her under the guidance of me.

I wish him a great success in his dissertation work.

Place : Signature of Principal/HOD

Date :

CERTIFICATE BY THE GUIDE

This is to certify that this dissertation entitled, "**COMPARATIVE STUDY ON THE EFFICACY OF MUSCLE ENERGY TECHNIQUE VERSUS MAITLAND MOBILIZATION IN TREATING SACRO ILIAC JOINT DYSFUNCTION"** submitted by (Reg.No.271410062) is a record of original and independent work done by the candidate during the period of study under my supervision and guidance. The dissertation represents entirely and independent work on the part of the candidate but for the general guidance by me.

Place :

Date:

Signature of Guide

Prof.V.Manivannan, M.P.T.(Ortho)

Principal/Head of The Institution,

Nandha College of physiotherapy,

Erode -636 052.

DECLARATION

I here, by declare and present my project work entitled **"COMPARATIVE STUDY ON THE EFFICACY OF MUSCLE ENERGY TECHNIQUE VERSUS MAITLAND MOBILIZATION IN TREATING SACRO ILIAC JOINT DYSFUNCTION"** is outcome of original research work was under taken and carried out by me under the guidance of Prof. **.V.MANIVANNAN.,M.P.T.,**

To the best of my knowledge this dissertation has not been formed in any other basic for the award of any other degree, diploma, associateship, fellowship, previously form, any other medical university.

Register No:
271410062

ACKNOWLEDGEMENT

First and foremost thank to the lord almighty for bestowing me with knowledge and lige that has enabled me to begin and complete this project successfully.

It is impossible to do a project without involvement of various experts and other concerned people. So, I use this incredible moment to thank everyone who used to strongly influence and facilitate me towards selection, progression and successful completion of this project work.

My sincere thanks to our principal and guide, **Prof.V.Manivannan MPT(Ortho),** for supporting me and who was instrumental in bringing out if this project. He constantly encouraged me to give my best

My hearty thanks to my research advisor **Prof. K. Saranya Devi MPT (Ortho),** Assistant professor, **Prof. V. Vijayaraj MPT (Neuro),** Nandha College of Physiotherapy who moulds me an effective person by his encouragement and enormous support.

I am grateful to all our **Professors of Nandha College of Physiotherapy,** for their valuable inputs and advice they gave me regarding the various aspects of application of this technique.

I also thank **Prof. K. Dhanapal**, M.Sc., who scrutinized and rectified the study's blue print and assisted in the analytical aspects of this research work.

I thank all my Staff Members, My Seniors, My Friends who helped in compiling the data, manuscripts, typing, etc.,

Looking at the list of people who have contributed in making this gargantuan task a reality, I feel Humble.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHS

1. INTRODUCTION

Sacroiliac joint dysfunction is a condition in which the joint is locked, Partially dislocated (or) subluxated in a non-anatomical position due to hyper Mobility (or) hypo mobility within the joint.

Dysfunction of sacroiliac joint may causes low back (or) leg pain. Sacroiliac Joint dysfunction can mimic the pain caused by a number of others spinal structures. Lumbar disc, nerve root, facet joint. The pain is typically felt on one side of buttocks, and can radiate down to the leg.

The pain usually remains above the knee but at times pain can extend to the ankle or foot. It is reported that it 15% to 38% of general population with women being 3 (or) 4 times more likely to be affected than men.

There are many different causes of sacroiliac joint pain, pregnancy may be a factor in developing of sacroiliac joint dysfunction. Also it is a lesion has one leg is shorter than the other leg. The abnormal alignment may end up causing sacroiliac joint pain and problems.

The most important role is played by the physiotherapist, in which Physiotherapy reduces pain and improves the joint range of motion and muscle Power.

Many physiotherapeutic interventions are done which include exercise therapy and electro therapy. Electro therapy includes paraffin wax path. Exercise therapy includes active and passive movements, soft tissue stretch and isometric stabilizing exercise, general grip strengthening exercise and passive joint mobilization technique.

Muscle Energy Technique t is a type of osteopathic manipulative treatment in which patient's use their muscles actively upon request. It is used to treat somatic dysfunction, decreased ROM, muscular hypertonicity, muscular spasm, and pain. It's also engages and regulates sensorimotor impulses and any musculature that moves a particular body joint. MET is most effective for the mobilization of joints, correction of postural and movement asymmetries, stretching of muscles and reduction of pain.

The Maitland technique is a passive skilled manual therapy technique Applied to joint and related soft tissue at varying speeds and amplitudes, using Physiological or accessory motions to improve the sacroiliac joint function.

Mobilization provides strong inhibitory stimulus through large afferent myelinated fibers of the dorsal horn to block the small diameter of nociceptive, Input through a pain gate mechanism and enhance the physiological movements.

The study aims to compare study between Muscle Energy Technique versus Maitland's mobilization in treating patients with sacroiliac joint dysfunction.

1.1. AIM OF THE STUDY

The aim of the study was to compare the efficacy of Muscle Energy Technique versus Maitland's mobilization in treating patients with sacroiliac joint dysfunction.

1.2. OBJECTIVES OF STUDY

1. To determine the efficacy of the muscle energy technique.
2. To determine the efficacy of Maitland's mobilization.
3. To determine the difference between the efficacy of Muscle Energy Technique versus Maitland's Mobilization in treating patients with sacroiliac joint Dysfunction.

1.3 HYPOTHESIS

- **NULL HYPOTHESIS**

The null hypothesis states that there was no significant difference between the efficacy of muscle energy technique versus Maitland's mobilization in treating patients with sacroiliac joint dysfunction.

- **ALTERNATIVE HYPOTHESIS**

The alternative hypothesis states that there was significant difference Between the efficacy of muscle energy technique, versus Maitland's mobilization in treating patients with Sacroiliac joint dysfunction.

2. REVIEW OF LITERATURE

1) Rana Kanchan and Bansal Nitesh (2009)

Conducted an experimental study on 45 subjects with low back pain. The aim of the study was to compare the effects of muscle energy technique and Maitland's mobilization along with exercise. The main outcome range of oswestry disability index and visual analogue scale were measured. The result of the study conclude that the active exercise muscle energy technique (MET) is moderately significant over the G.D Maitland's technique of mobilization in improving functional ability and increased the medial rotation of hip joint in mechanical chronic low back pain caused by sacroiliac joint dysfunction.

2) Dhinkaran Mullai and Sareen Aarti (2011)

Conducted an experimental study on 30 subjects with scaroiliac joint dysfunction. The aim of the study compare the effects of muscle energy technique with conventional therapy. The main outcome range of Oswestry disability index (ODI) and numeric pain rating scale (NPRS) were measured. The result of the Study conducted. The average of the Oswestry disability index (1%) relief decrease for Group A is 27.15% and Group B it is 19.67% and the average of numeric pain rating scale relief for pain Group A is 3.40 and for Group B is 2.60 so the result of the study showed that along with corrective exercises. MET is moderately significant over other treatments.

3) Karen L Lenehan Bsc, Gary Fryer BappSC (2005)

Conducted an experimental study on 59 subjects with sacroiliac joint dysfunction. The purpose of study was evaluate the effect of the muscle energy technique. The result of the study concluded that the muscle energy technique is restricts rotation of thoracic spine and increases the range of active trunk rotation.

4) Niemisto, Leena MD and Lahtinen-suopanki

Conducted a randomized prospective trial on 204 patients with low back ache. The aim of the study was to find out the combined effectiveness of combined manipulation treatments and stabilizing exercise and physician consultation. The main outcome was reduction of the pain and disability. The study concluded that manipulation with stabilizing exercise was more effective in reducing pain, Intensity and disability.

5) Scrimshaw S.R. et.,al (2001)

Conducted a comparative study between responsiveness of visual analogue Scale and McGill pain questionnaire. It was measured in 75 patients and conclude. That VAS was a better tool than the McGill pain questionaires for measuring pain In clinical practice. "Journal of manipulative physical therapy", vol 24 Pp;501-504(2001).

6) George Lewith, et.al.,

Conducted an experimental study on 36 subjects with low back pain and They were randomly divided into 2 groups. One group received manipulation therapy, another group received standard physical therapy (heat modalities and exercise). The visual analogue scale was used for evaluating the pain. The result of the study showed that there was as significant reduction of pain intensity and improvement in range of motion in the manipulative therapy group compared to standard physical therapy group.

7) O'SULLIVAN, PETTER.B.,et.al., (1997)

Conducted a randomized, controlled study on 44 patients, with chronic low Back pain and they were divided into two groups randomly. One group received 10 week specific spinal exercise program, another group received conventional Therapy. The study showed that there was a statistically significant reduction of Pain intensity and functional disability levels in specific exercise group.

8) FOWLER.B., et.al., (1995)

Conducted an experimental study on 23 patients with mechnaical low back pain. They were treated with spinal manipulative therapy for a period of 7-10 days. The Study explained that 18 patients showed that definite clinical improvements with reduction in low back pain. The study concluded that the mechanical low back pain could be effectively treated by spinal manipulative therapy.

9) LEON CHAIT N.D (2007)

Conducted a experimental study with pelvic pain and dysfunction. The aim of the study was to compare the effects of physiotherapy approach and manual therapy. The main outcome were range of active and pain were measured. The result of the study conducted that physiotherapy approach and manual therapy techniques increases the range of motion and decrease the pain level.

10) Ulrika Holmgren & Kerstin Waling (2007)

Conducted an experimental study on 25 patients with low back pain, purpose of the study was to evaluate the effects of muscle energy technique application were effectively increase the range of motion in sacroiliac joint and reduce the pain.

11)Fairbank, Jeremy C. T. MD, FRCS*; Pynsent, Paul B. PhD† 2000

Conducted a systematic review of the Oswestry Disability Index (ODI) . they found that the ODI remains a valid and vigorous measure and has been a worthwhile outcome measure after comparing 200 citations with at least 114 studies that contain usable data. These data provide both validation and standards for other users and indicate the power of the instrument for detecting change in sample populations.

12)PE Bijur, W Silver, EJ Gallagher - Academic emergency …, 2001

Conducted a study to assess the reliability of the VAS for measurement of acute pain. The paired measurements were more reproducible at the extremes of pain intensity than at moderate levels of pain. The Reliability of the VAS for acute pain measurement as assessed by the ICC appears to be high. Ninety percent of the pain ratings were reproducible within 9 mm. These data suggest that the VAS is sufficiently reliable to be used to assess acute pain.

13)Franke H, Fryer G, Ostelo RW, Kamper SJ. (2015)

Low-back pain (LBP) is responsible for considerable personal suffering due to pain and reduced function, as well as the societal burden due to costs of health care and lost work productivity. For the vast majority of people with LBP, no specific anatomical cause can be reliably identified. For these people with non-specific LBP there are numerous treatment options, few of which have been shown to be effective in reducingpain and disability. The muscle energy technique (MET) is a treatment technique used predominantly by osteopaths, physiotherapists and chiropractors which involves alternating periods of resisted muscle contractions and assisted stretching.

14)Day JM, Nitz AJ. (2012)

Low back pain is the most common type of pain reported by adults in the United States. A variety of manual therapy techniques are used in the management of low back pain to reduce pain, improve function, and reduce disability. In recent years, muscle energy techniques have been increasingly used in clinics to treat low back pain.

15) Richardson CA, Snijders CJ, Hides JA, Damen L, Pas MS, Storm J. (2002)

Contraction of the transversus abdominis significantly decreases the laxity of the sacroiliac joint. This decrease in laxity is larger than that caused by a bracing action using all the lateral abdominal muscles. These findings are in line with the authors' biomechanical model predictions and support the use of independent transversus abdominis contractions for the treatment of low back pain.

16) George SZ, Wittmer VT, Fillingim RB, Robinson ME. (2010)

Physical therapy supplemented with graded exercise or graded exposure resulted in equivalent clinical outcomes for pain intensity and disability. The overall treatment effects were modest in this setting. Instead of being associated with a specific behavioral intervention, reductions in pain and disability were associated with reductions in depressive symptoms and pain catastrophizing, respectively.

17) Hurley DA, McDonough SM, Baxter GD, Dempster M, Moore AP. (2005)

The use of mobilization techniques within the trial was comparable with their usage by the general population of physiotherapists in Britain and Ireland for LBP management. However, the usage of manipulation techniques was considerably higher than reported in physiotherapy surveys and may reflect the postgraduate training of trial therapists.

18)Meade TW, Dyer S, Browne W, Townsend J, Frank AO. (1991)

In this study, patients with low back pain in whom manipulation is not contraindicated, chiropractic almost certainly confers worthwhile, long-term benefit in comparison with hospital outpatient management. The benefit is seen mainly in those with chronic or severe pain. Introducing chiropractic into NHS practice should be considered.J Orthop Sports Phys Ther 1991;13(6):278-287.

3. MATERIALS AND METHODOLOGY

3.1 MATERIALS

- Couch
- Pillows
- Towel
- Back rest chair
- Visual analogue scale
- Oswestry disability index

❖ METHODOLOGY

3.2 STUDY DESIGN

Quasi experimental study with Pre Versus Post test design

3.3 STUDY SETTING

- ✓ Nandha College of Physiotherapy-Erode
- ✓ Government headquarters hospital-Erode
- ✓ LKM Hospital, Erode.
- ✓ SIMS Hospital, Erode.

3.4 STUDY SAMPLING

A Total number of 30 subjects were selected by convenient sampling Method after giving due consideration to inclusion and exclusion criteria and they Were divided into 2 groups namely Group A and B with 15 Subjects in each groups.

3.5 STUDY DURATION

The Study was conducted for a period of 4 weeks.

3.6 INCLUSION CRITERIA

- ✓ Age group 30-45 Years.
- ✓ Sex – Both male and female
- ✓ Sacroiliac dysfunction patients

3.7 EXCLUSION CRITERIA

- ➢ Pregnancy
- ➢ IVDP
- ➢ Fracture
- ➢ Spondylolisthesis
- ➢ Associated cardiovascular disease
- ➢ Sacroiliac tumors
- ➢ Osteoporosis
- ➢ Spinal stenosis
- ➢ Myofascial syndrome
- ➢ Piriformis syndrome
- ➢ Gout
- ➢ Lumbar dysfunction

3.8 PARAMETERS

- **Visual Analogue Scale (VAS)**

Visual Analogue Scale was used to measure the severity of pain response that the patient experience. It is a 10 cm horizontal line with two ends labeled, no pain (0) at one end and severe pain (10) at other end. The pain marked on the line which corresponds to severity of pain patients experienced.

- **Oswestry Disability Index**

Functional ability was measured by using Oswestry Disability Index which consist of 10 sections with 6 statements contained in each section. The patients were made to mark on the one statement in each section which described their limitation most accurately.

3.9 PROCEDURES

A total number of thirty subjects who met inclusion criteria and exclusion criteria were recruited. After informed consent was obtained, they were divided into two groups A and B with subjects 15 each.

Prior to the treatment, pre test were conducted for Group A and Group B with Visual Analogue Scale for pain, Oswestry, Disability Index for functional ability.

After a brief demonstration about muscle energy technique, Group A were treated with the same for a period of 4 weeks.

After a brief demonstration about Maitland's mobilization with exercises, Group B were treated with the same for a period of 4 weeks.

The post test were conducted for Group A and Group B by Visual Analogue Scale for pain, Oswestry Disability Index for functional ability.

Pre and Post results were recorded and analyzed.

3.10 STATISTICAL TOOLS

The collected data was subjected to statistical analysis using paired and unpaired "t" test to find out the research effectiveness.

❖ PAIRED –"t"-TEST

The paired "t" test was used to compare the pre and post test values of Visual Analogue Scale for pain, Oswestry Disability Index for functional ability.

❖ FORMULA: Paired "t" test

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{S}$$

d = Difference between the pre test versus post test

$\bar{d}$ = Mean difference

n = Total number of subjects

S = Standard deviation

❖ **UNPAIRED "t" – TEST**

The unpaired "t" test was used to compare the mean difference between Group A and Group B subjects treated with Muscle Energy Technique, and Maitland's Mobilization.

FORMULA :- Unpaired "t" – Test

$$S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

$$t = \frac{|\overline{X_1} - \overline{X_2}|}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

n_1 = Total number of subject in Group - A

n_2 = Total number of subject in Group – B

X_1 = Difference between pre test versus post test of Group – A

$\overline{X_1}$ = Mean difference between pre test versus post text of Group – A

X_2 = Difference between pre test versus post text of Group – B

$\overline{X_2}$ = Mean difference between pre test versus post text of Group – B

S = Standard deviation

4. DATA PRESENTATION

TABLE – I

S. No.	GROUP – A Muscle Energy Technique				GROUP – B Maitland's Mobilization			
	Oswestry Disability Index		VAS in cms		Oswestry Disability Index		VAS in cms	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1.	29	17	8	4	27	20	8	6
2.	25	15	6	2	27	22	7	3
3.	25	13	6	3	29	22	8	5
4.	28	15	6	2	25	18	6	4
5.	25	15	7	3	29	22	7	4
6.	29	18	8	4	25	19	6	3
7.	25	13	6	3	25	18	7	5
8.	28	16	7	4	28	18	5	3
9.	28	19	7	3	28	18	8	4
10.	29	20	6	2	29	19	8	5
11.	27	18	8	5	30	23	7	4
12.	30	20	9	5	25	17	6	3
13.	27	15	5	2	27	16	7	4
14.	28	17	6	3	25	15	6	4
15.	29	18	8	4	28	17	6	3

5. DATA ANALYSIS AND INTERPRETATION

This section deals with analysis and interpretation of data's from pre and Post test result of Group A and Group B

TABLE – II

Group – A

The comparative main value, mean difference, standard deviation and Paired t – value between pre Vs post test of Oswestry Disability Index in Group A.

S. No	Test	Mean	Mean Difference	S.D	Paired t - value
1.	Pre – Test	27.5	10.9	1.3	32.7
2.	Post – Test	16.6			

The paired "t" value of 32.7 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 27.5, post test mean was 16.6 and mean difference was 10.9, which showed that there was reduction of disability level in response to effect of muscle energy technique.

TABLE – III

Group – B

The comparative main value, mean difference, standard deviation and Paired t – value between pre Vs post test of Oswestry Disability Index in Group B.

S.No	Test	Mean	Mean Difference	S.D	Paired t - value
1.	Pre – Test	27.1	8.2	1.9	16.9
2.	Post – Test	18.9			

The paired "t" value of 16.8 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 27.1, post test mean was 18.9 and mean diffrence was 8.2, which showed that there was reduction of disability level in response to effect of Maitland'smobilization.

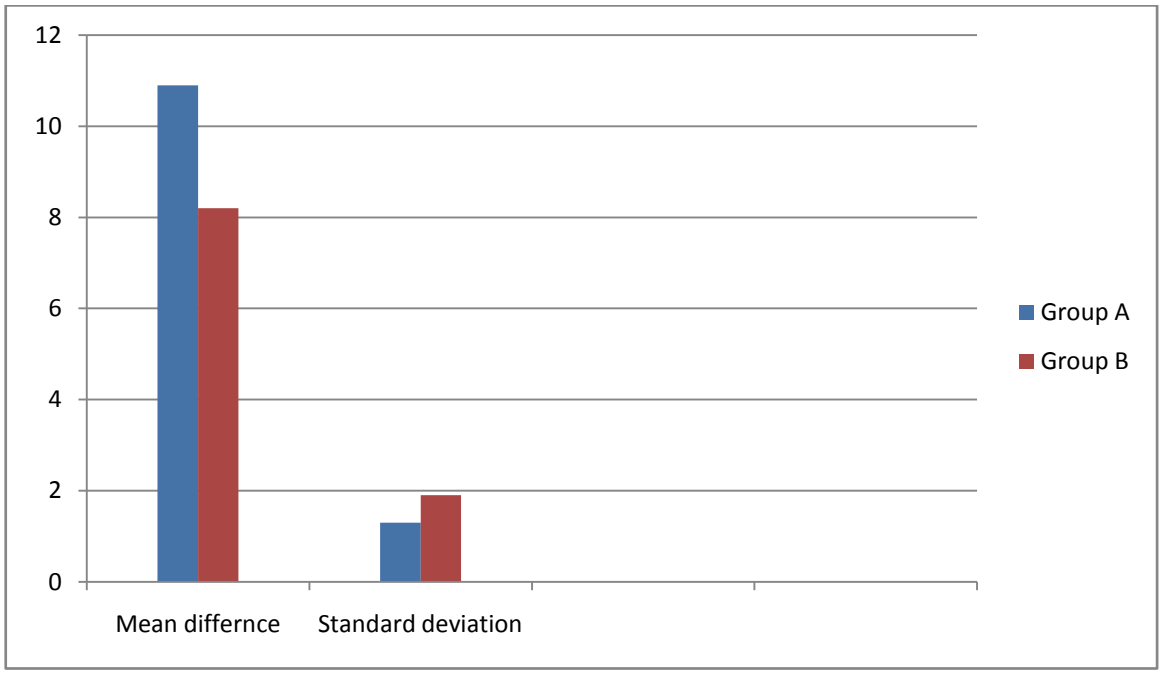


TABLE – IV

The comparative main value, mean difference, standard deviation and Paired t – value of Oswestry Disability Index between Group A and Group B.

S.No	Test	Mean	Mean Difference	S.D	Unpaired t - value
1.	Group - A	10.9	2.7	1.6	4.5
2.	Group - B	8.2			

The unpaired “t” value of 4.5 was greater than the tabulated t – value of 2.5 which showed that there was a statistically significant difference at 0.05 levels between mean difference of Group A and Group B. The pre Vs post mean of group A was 10.9, the pre Vs post mean of Group B was 8.2 and mean difference group A and Group B was 2.7 which showed that there was reduction of disability level in response to treatment of Group A when Compared to Group B.

Therefore, the study was rejecting the null hypothesis and accepting the alternate hypothesis.

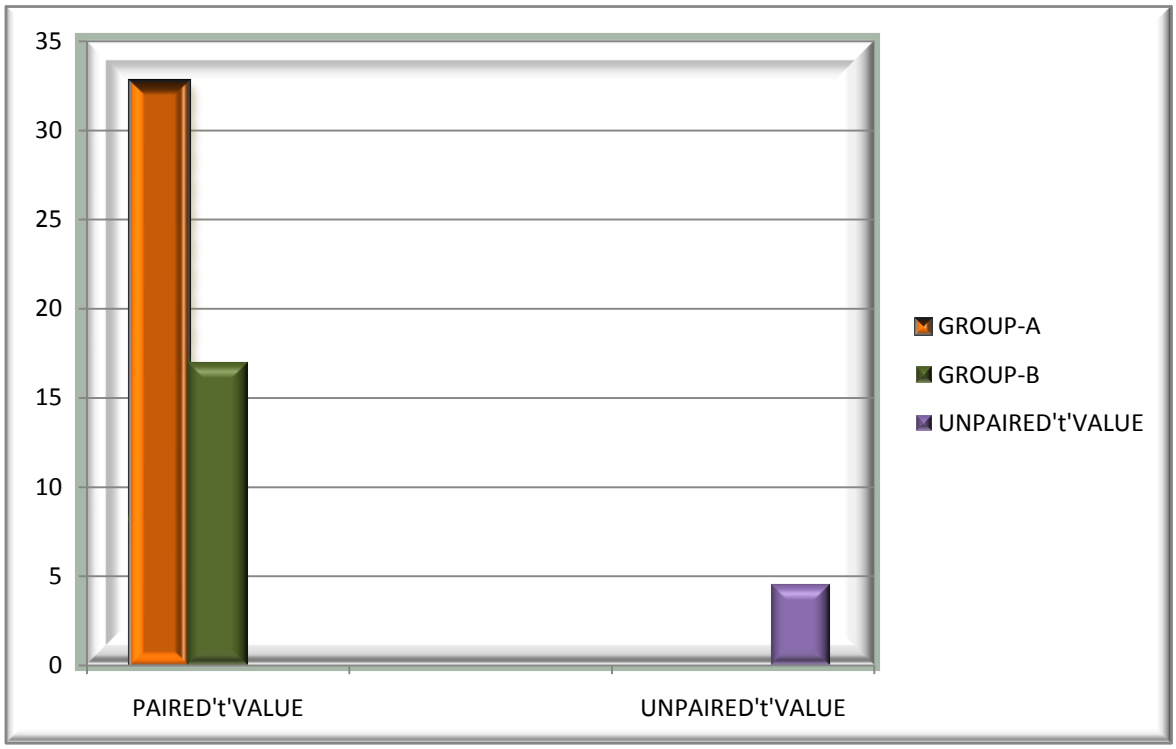


TABLE – V

Group – A

The comparative main value, mean difference, standard deviation and Paired t – value between pre Vs post test of Visual Analogue scale in Group A.

S.No	Test	Mean	Mean Difference	S.D	Paired t - value
1.	Pre – Test	6.9	3.6	0.5	28.08
2.	Post – Test	3.3			

The paired "t" value of 28.08 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 6.9, post test mean was 3.3 and mean difference was 3.6, which showed that there was reduction of pain due to the combined effect of Muscle Energy Technique

.

TABLE – VI

Group – B

The comparative main value, mean difference, standard deviation and Paired t – value between pre Vs post test of Visual Analogue scale in Group B.

S.No	Test	Mean	Mean Difference	S.D	Paired t - value
1.	Pre – Test	6.8	2.8	0.7	15.6
2.	Post – Test	4.0			

The paired "t" value of 15.6 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 6.8, post test mean was 4.0 and mean difference was 2.8, which showed that there was reduction of pain in response to Maitland's mobilization.

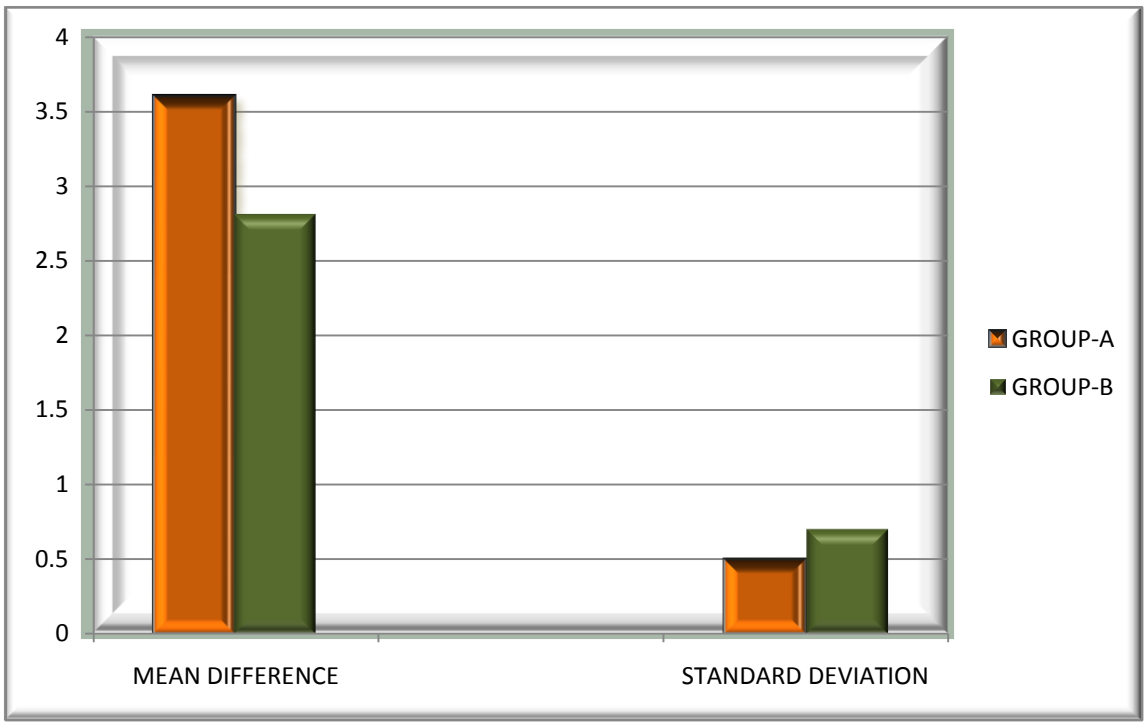


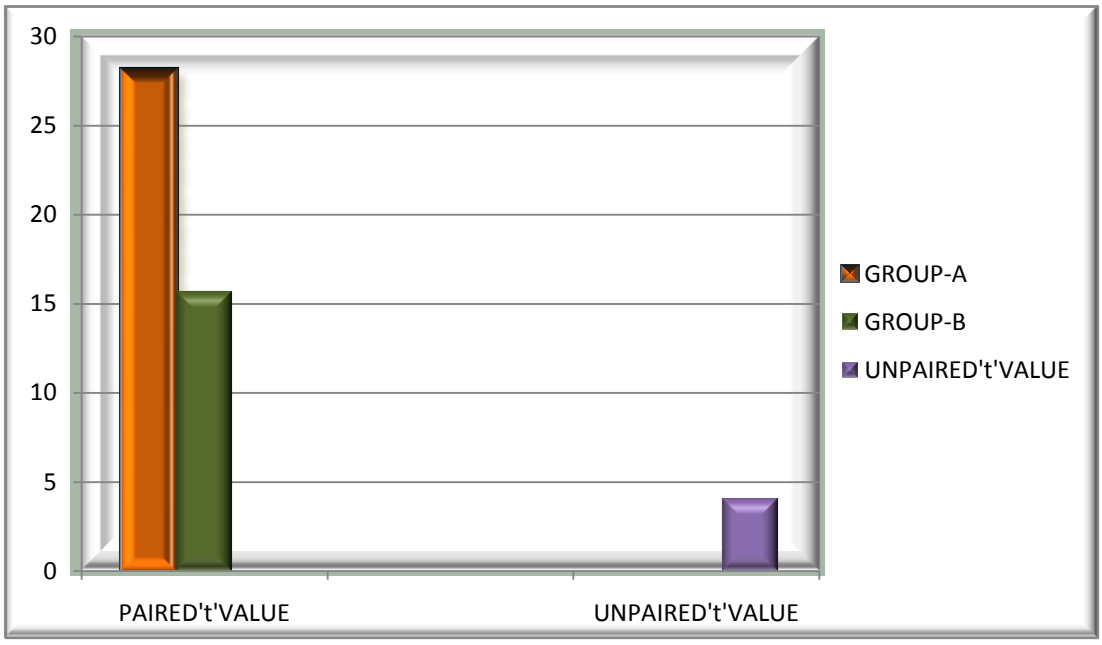
TABLE – VII

The comparative main value, mean difference, standard deviation and Paired t – value of Visual Analogue scale between Group A and Group B.

S.No	Test	Mean	Mean Difference	S.D	Unpaired t - value
1.	Group - A	3.6	0.8	0.6	4
2.	Group - B	2.8			

The unpaired “t” value of 4.0 was greater than the tabulated t – value of 2.05 which showed that there was a statistically significant difference at 0.05 levels between Group A and Group B. The pre test mean of Group A was 3.6, the post test mean was 2.8 and mean difference of Group A and Group B was 0.8 which showed that significant reduction of pain in response to treatment of Group A when Compared to Group B.

Therefore, the study was rejecting the null hypothesis and accepting the alternate hypothesis.



6. DISCUSSION

The aim of the study was to compare study between Muscle Energy Technique versus Maitland's mobilization in treating patients with sacroiliac joint dysfunction.

George Lewith, et.al.,

The result of the study showed that VAS can be used as parameter to quantify the pain intensity and there was decreased pain threshold in patients with sacroiliac joint dysfunction.

Re Erahard, et.al.,

The result of the study showed that Oswestry Disability Index can be used as a parameter to quantify the functional ability and there was decreased disability level in patients with sacroiliac joint dysfunction.

Based on the results of the above studies Visual Analogue Scale and Oswestry Disability Index were taken as a parameter in the present study.

In the analysis and interpretation of Oswestry Disability Index in Group A

The paired "t" value of 32.7 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 27.5, post test mean was 16.6 and mean difference was 10.9, which showed that there was statistically significant reduction in their disability level in response to effect of Muscle Energy Technique.

In the analysis and interpretation of Visual Analogue Scale in Group A

The paired "t" value of 28.08 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 6.9, post test mean was 3.3 and mean difference was 3.6, which showed that there was reduction of pain Due to the effect of Muscle Energy Technique.

.

In the analysis and interpretation of Oswestry Disability Index in Group B

The paired "t" value of 16.8 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 27.1, post test mean was 18.9 and mean difference was 8.2, which showed that there was reduction of disability level in response to effect of Maitland's mobilization.

In the analysis and interpretation of Visual Analogue Scale in Group B

The paired "t" value of 15.6 was greater than the tabulated t – value of 2.14 which showed that there was a statistically significant difference at 0.05 levels between pre Vs post test results. The pre test mean was 6.8, post test mean was 4.0 and mean difference was 2.8, which showed that there was reduction of pain in response to Maitland's mobilization.

IN THE COMPARISON OF GROUP A AND GROUP B

In the analysis and interpretation of Oswestry Disability Index between Group A and Group B

The unpaired "t" value of 4.5 was greater than the tabulated t – value of 2.5 which showed that there was a statistically significant difference at 0.05 levels between mean difference of Group A and Group B. The pre Vs post mean of group A was 10.9, the pre Vs post mean of Group B was 8.2 and mean difference group A and Group B was 2.7 which showed that there was statistically significant reduction of disability level in response to treatment of Group A when Compared to Group B.

In the analysis and interpretation of Visual Analogue Scale between Group A and Group B

The unpaired "t" value of 4.0 was greater than the tabulated t – value of 2.05 which showed that there was a statistically significant difference at 0.05 levels between Group A and Group B. The pre test mean of Group A was 3.6, the post test mean was 2.8 and mean difference of Group A and Group B was 0.8 which showed that significant reduction of pain in response to treatment of Group A when Compared to Group B.

Based on the statistical analysis and interpretation of the results, the present Study showed that there was significant improvement in disability level and Reduction of pain, who were treated with muscle energy technique

POSSIBLE MECHANISM OF PAIN RELIEF BY MUSCLE ENERGY TECHNIQUE

- There is viscoelastic change in muscle which in increases the muscle flexibiliaty after MET
- When the muscle contrats isometrically from lengthened position, it induces the stretching of the connective tissue elements, this produce increase in range of motion.
- Increase in flexibility leads to increase in tolerance to stretch.
- After following MET, there is significant increase in joint angle due to a change in tissue property.
- Restoration of the motion to the articulation.
- Results in a gapping, or resulting of the distorted joint relations with reflex relaxation of the previously hypertonic musculature.
- When gentle contraction is initiated in the agonist muscle, there is a reflex relaxation of that muscle antagonist group.
- It also engages and regulates sensorimotor impulses and any musculature that moves a particular body joint. it uses three dimensional positioning of joints followed by an isometric contraction, engaging the golgi tendon organ to allow for inhibition of agonist muscles.
- Increases ability to perform movement tasks.
- Improves joint integrity and mobility.
- Improves motor function.
- Increases tolerance to positions and activities.

7. SUMMARY

The aim of the study was to compare the effect of muscle energy technique versus Maitland's mobilization in treating patients with sacroiliac joint dysfunction.

A total number of 30 subjects with sacroiliac joint dysfunction were selected by convenient sampling method after considering the inclusion and exclusion criteria.

Oswestry Disability Index and Visual Analogue Scale were taken as parameter, pre test data were collected for Group A and Group B and computed.

Group A subjects were subjected to muscle energy technique for a period of 4 weeks. Group B subjects were subjected to Maitland's mobilization for a period of 4 weeks. The paired "t" test was used to compare the per Vs post test result of Group A and Group B separately. The unpaired "t" test was used to compare the mean difference of Group A and Group B.

In the analysis and interpretation of Oswestry Disability Index, the unpaired "t" value of 4.5 was greater than the tabulated t – value of 2.05 at 0.05 level, which showed that there was statistically significant difference between Pre Vs Post tests results of Group A Group B. The mean value of Group A was 10.9, Group B was 8.2 and mean difference of Group A and Group B was 2.7 which showed that there was statistically significant reduction of disability in response to treatment in Group A when compared to Group B.

In the analysis and interpretation of Visual Analogue Scale for pain, the unpaired “t” value of 4.0 was greater than the tabulated t – value of 2.05 at 0.05 level, which showed that there was statistically significant difference between Group A and Group B. The mean value of Group A was 3.6, Group B was 2.8 and the mean difference was 0.8, which showed that there was significant reduction of pain in Group A than Group B in response to treatment.

CONCLUSION

Based on these results, this study concluded that Muscle Energy Technique was effective in reduction of pain and disability in patients with sacroiliac joint dysfunction.

8. RECOMMENDATION

- Similar study can be conducted using large samples.
- McGill pain questionnaire can be used as a parameter in similar studies.
- Similar studies can be conducted to measure the lumbar spine flexibility using Schober's method.
- Similar study can be conducted by comparing Maitland mobilization with other physiotherapy modalities.
- Similar study can be conducted to find out the combined effect of Maitland mobilization and conventional therapy.
- Similar study can be conducted to find out the combined effect Mulligan and Maitland mobilization for low back ache.

9. **BIBLIOGRAPHY**

1. Brain R.Mulligan, **"Manual Therapy"**, 3rd Ed., 1996.
2. Boyling.O., Jeffrey, **" Grieve's Modern Manual Therapy – The Vertebral Colimn"**, Churchill Livingstone, 2nd Ed., 1995.
3. Brent Brotzmzn.S., **"Clinical Orthopedic Rehabilitation"**, Mospy Publication, 1996.
4. Carolyn Kisner, **"Therapeutic Exercise – Indian"**, 5th Ed.,
5. Kothari. C.R., **"Research Methodology: Method and Techniques"**, New Age International Ltd., New Delhi, 2nd Ed., 1990.
6. Magee.J., David, **" Orthopedic Physical Assessment"**, 2nd Ed., 1992.
7. Mahajan.B.K., **" Methods is Biostatics for Medical Students and Research Workers"**. Jaypee Brothers, New Delhi, 5th Ed., 1989.
8. Natarajan.S., **"Text Book of Orthopedics and Traumatology"**, 6th Ed.,
9. Jayant Joshi, **" Essentials of Orthopedics and Applied Physiotherapy"**, Indian Edition.
10. Carrier M.Hall, Lori Thein Broady, **" Therapeutic Exercise – Moving Towards the Function"**.

REFERANCES

1. Vincenzino.B, Paungmali.A., Teys.P., **"Mulligan's Mobilization with movements, positional faults and pain relief; Current concepts from a critical view of literature"**.
2. Peter konrad, Klaus Schmitz, Achim Denner, **" Neuromuscular evaluation of trunk-training exercise".**
3. Erhaed.R.E., Delitto.A., Cibulka.M.T., **" Relative effective of an extension program and a combined porgram of manipulation and flexion and extension exercises in patients with acute low back syndrome"**.
4. Elnaggar.I.M., et.al., **" Effects of sinal flexion and extension exercises on low back pain and spinal mobility in chronic low back pain patients"**.
5. Karst.G.M., Williett.G.M., **"Effects of specific instructions on abdominal muscle activity during trunk curl exercises"**.
6. Nachemson.A.L., **"The lumbars spine: An Orthopedic challenge"**, Spine, 1976, 1"Pp:59-71.
7. Parfrer.K.C., Docherty.D.,et.al., **"The effects of different sit and curl-up positions on activation of abdominal and hip flexor musculature"**.
8. Eugene J.Carragee and Mthew Hannibal, **"Diagnostic evaluation of low back pain"**, Orthopedic clinics of North America, Jan'2004,35:P:7-16.
9. Aure, Olav Frode.P.T., **"Manual therapy and exercise therapy in patients with chronic low back pain"**.
10. Andrzej Szczgiel, et.,al., **" Effectiveness of brain's Mulligan's manual therapy concept techniques in therapy of Patients with low back ache"**.

APPENDIX

INFORMED CONSENT TO VOLUNTARY PARTICIPATE IN A RESEARCH INVESTIGATION

Department of Physical Therapy

Nandha College of Physiotherapy

Erode – 638 052, Tamil Nadu.

Name :

Age :

Sex :

Occupation :

Address for communication :

Declaration

I have fully understood the nature the purpose of the study. I accept to be a Subject in this study. I declare that the above information is true to my knowledge.

Signature of the subject

Date :

Place :

ASSESSMENT CHART

Name :

Age :

Sex :

Occupation :

Address for communication :

Chief complaints :

Pain assessment :

Mode of treatment : Muscle Energy Technique / Maitland's Mobilisation

Measurements

Parameters	Before Treatment	After Treatment
Oswestry Disability Index		
Visual Analogue Scale for pain		

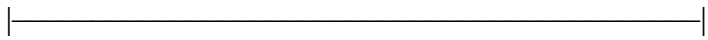
Signature of the investigator

PARAMETERS

VISUAL ANALOGUE SCALE

It is a assessment scale used to measure the intensity of pain response that the patients experience.

It consists of 10 cm horizontal line with 2 ends labeled no pain “0” and sever pain “10”. The patient on the while corresponds to severity of pain the patients experience.



0 10

No Pain Severe Pain

OSWESTRY DISABILITY INDEX

SECTION 1 – PAIN INTENSITY

- The pain comes and goes and it is very mild.
- The pain is mild and does not very much.
- The pain comes and goes and is moderate.
- The pain is moderate and does not very much.
- The pain comes and goes and is very severe.
- The pain is severe and does not very much.

SECTION 2 – PERSONAL CARE

- I would no have to change my way of washing or dressing in order to avoid pain
- I do not normally change my way of washing or dressing even though it causes some pain.
- Washing and dressing increases the pain, but i manage not to change my way of doing it.
- Washing and dressing increases the pain and i find necessary to change my way of doing it.
- Because of pain, I am unable to do some washing and dressing without help.
- Because of pain, I am unable to do any washing and dressing wihout help

SECTION 3 – LIFITING

- I can lift heavy weights without extra pain.
- I can lift heavy weights, but it causes extra pain.
- Pain prevents me from lifting heavy weights off the floor. But I manage if they are conveniently position (e.g., on a table)
- Pain prevent me from lifting heavy weights off the floor.
- Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- I can only lift very light weight at the most.
-

SECTION 4 – WALKING

- I have no pain on walking.
- I have some pain on walking, but it does not increase with distance.
- I cannot walk more than 1 mile without increasing pain.
- I cannot walk more than ½ mile without increasing pain.
- I cannot walk more than ¼ mile without increasing pain.
- I cannot walk at all without increasing pain.

SECTION 5 – SITTING

- I can sit any chair as long as I like.
- I can only sit in my favorite chair as long as I like.
- Pain prevents me from sitting more than 1 hour.
- Pain prevents me from sitting more than ½ hour.
- Pain prevents me from sitting more than 10 mins.
- I avoid sitting because it increases pain right away.

SECTION 6 – STANDING

- I can stand as long as I want without pain.
- I have some pain on standing, but it does not increase with time.
- I cannot stand for a longer than 1 hour without increasing.
- I cannot stand for a longer than ½ hour without increasing.
- I cannot stand for a longer than 10 mins without increasing.
- I avoid standing because it increases the pain right away.

SECTION 7 – SLEEPING

- I get no pain in bed.
- I get pain in bed, but it does no prevent me from sleeping well.
- Because of pain, my normal night's sleep is reduced by less than ¼.
- Because of pain, my normal night's sleep is reduced by less than ½ .
- Because of pain, my normal night's sleep is reduced by less than ¾ .
- Pain prevents me from sleeping at all.

SECTION 8 – SOCIAL LIFE

- My social life is normal and gives me no pain.
- My Social life is normal, but increases the degree of pain.
- Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., dancing etc.,
- Pain has restricted my social life and I do not go out very often.
- Pain has restricted my social life to my home.
- I have hardly any social life because of pain.

SECTION 9 – TRAVELLING

- I get no pain while traveling.
- I get some pain while traveling, but none of my usual forms of travel makes it any worse.
- I get extra pain while traveling, but it does not compel me to seek alternative forms of travel.
- I get extra pain while traveling, which compel me to seek alternative forms of travel.
- Pain restricts all forms of travel.
- Pain prevents all forms of travel except that done lying down.

SECTION 10 – CHANGING DEGREE OF PAIN

- My pain is rapidly getting better.
- My pain fluctuates, but is definitively getting better.
- My pain seems to be getting better, but improvement.
- My pain is slow at present.
- My pain is neither getting better nor worse.
- My pain is gradually worsening.
- My pain is rapidly worsening.

TREATMENT PROCEDURE

MUSCLE ENERGY TECHNIQUE FOR SACROILIAC JOINT DYSFUNCTION

I. Iliac inflare

II. Iliac outflare

III. Anterior iliac rotation

IV. Posterior iliac rotation

a) ILIAC INFLARE

Patient Position

Supine Lying

Therapist Position

Therapist stands on the same side of the problem facing leg side.

Hand Placement

Cephalad hand stabilizing non affected side ASIS, caudal hand holding the ankle of the affected side.

Starting Position

Flexion abduction and full external rotation of hip holding the leg on un affected knee.

Ending Position

Abduction of hip against the resistance of restraining arm for 10 secs while Holding the breath, repetition 2 – 3 mins. On relaxation complete exhalation Position.

b) ILIAC OUTFLARE

Patient Position

Supine Lying

Therapist Position

Stands same side dysfunction ilium facing towards the body.

Hand Placement

Supinated cephalad hand place under the patients buttock with fingr tip Hooked into sacral sulcus of the affected side.

Caudal hand hold the patients foot and the feature side with the forearm resting along medial calf bar shin area of the hand grasp the floor.

Starting Position

Hip on affected side is fully flexed adducted and internally rotated.

Ending Position

Abduction against the resistance with 50% of the strength for 10 secs while Holding for breath.

c) ANTERIOR ILIAC ROTATION

Patient position

Prone Lying

Therapist Position

Stands on the treatment side at waist level.

Starting Position

The legs and hips are flexed over the edge of the table. The foot and ankle grasped between practitioner leg. The table side hand stabilizes the sacral area.

Ending Position

Patient is asked inhale and hold the breath and try to straighten the legs Against the resistance with 20% of available strength with 10 secs hold.

d) POSTERIOR ILIAC ROTATION

Patient Position

Prone lying

Therapist Position

Stands opposite the dysfunction sacroiliac joint. Table side hand support the Anterior aspect of the hand PSIS of affected side.

Starting Position

Hyper extension to the end movement.

Ending Position

Try to make flexion against resistance for 10 counts for 10secs with 20% of strength of holding breath.

SACROILIAC JOINT MOBILIZATION

Mobilizations are techniques used by professionals such as physiotherapists, chiropractors and osteopaths to help promote fluid movement at a joint.

Due to the specialist knowledge required and room for error, these techniques should not be attempted by anyone who is not suitably qualified.Rolled up towel technique

- Using 2 rolled up towels placed correctly under the pelvis, it is possible to encourage the offending rotated ilia to return to its correct position.
- The patient should be lying in the prone position with one towel located under the Anterior superior Iliac spine (ASIS) and the other towel lower down under the opposite anterior Inferior Iliac spine (AIIS) With are bony landmarks on the Ilia.
- The patients body weight will encourage the ilias to rotate and if this is accompanied by soft tissue massage work to the low back and gluteal muscles this will further encourage rotated correction.
- In order to place the towels in the correct position the correct diagnosis has to be made. See Diagnostic tests. The wrong diagnosis will make things worse.

ARTICULATING THE SACROILIAC JOINT

- The therapist places one hand under the patients located across the sacrum and iliac joint. This is in preparation of feel the quality of movement between the 2 bones.
- Using the leg as a lever the knee can be gently rotated round in circles to mobilize the sacroiliac joint.
- In order to engage the joint you may have to use more hip flexion and an element of compression whilst rotating the limb.

- Movement can be detected with your hand a cross joint whilst mobilization occurs. This should continue until quality of movement is detected a cross the sacroiliac joint.

STRAIGHT LEG MOBILIZATION

- With the leg straight, the therapist uses their bodyweight to mobilize the leg forwards and backwards.
- This help to improve mobility of the sacroiliac joint

APPENDIX –V

INFORMED CONSENT

This is to certify that I, …… totally agree to be a subject for the project work "**COMPARATIVE STUDY ON THE EFFICACY OF MUSCLE ENERGY TECHNIQUE VERSUS MAITLAND MOBILIZATION IN TREATING SACRO ILIAC JOINT DYSFUNCTION"** and I assure that I will not initiate or undergo any other treatment or concurrent exercise programme during the course of this study.

I own all the responsibilities of my health condition, if any untoward development happened during the course of this study.

Date : Signature of the Patient

Date : Signature of the Candidate